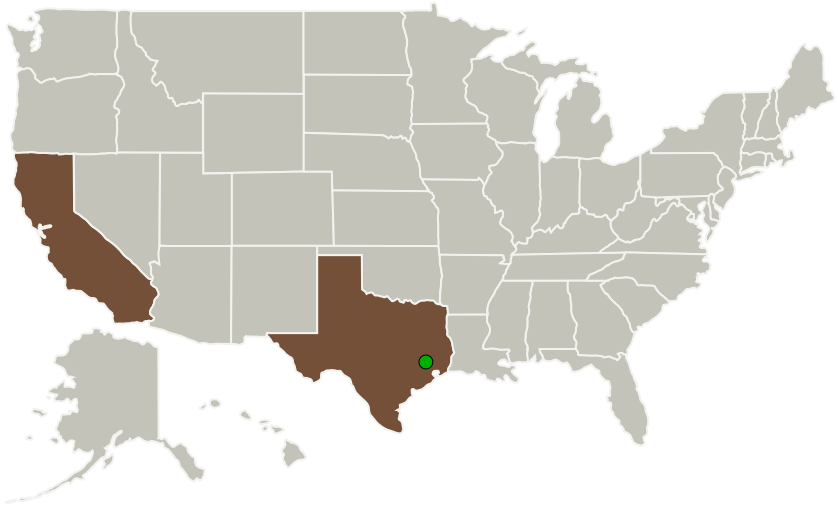
Modified Ionic Liquid-Based High-Performance Lubricants for Robotic Operations, Phase II

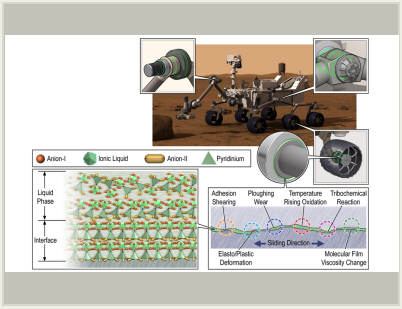
Completed Technology Project (2012 - 2014)

Project Introduction

NASA needs an advanced lubrication solution for its future robotic systems and planetary surface assets. The required lubrication technology must offer low-temperature performance while minimizing wear in these robotic systems and reducing the maintenance needed to keep them running. In this Phase II project, InnoSense LLC (ISL) proposes to meet NASA's need by further-engineering of its IonoGlide™ liquid-based lubricants and validating its performance through testing by third party. IonoGlide lubricants offer low-temperature performance with limited off-gassing and high decomposition temperatures. ISL's approach is to introduce proprietary additives to the ionic liquid matrix to impart thermal stability and enhance lubricity. This depresses the apparent freezing point while maintaining high decomposition temperatures. Through electrostatic interactions, the proprietary additive and ionic liquid form an order. With near metallic surfaces, this quasi-ordering contribute to improved lubricity. Phase I testing shows that ISL's lubricant outperforms top commercially available lubricants. ISL will work with a major NASA contractor to test lubrication efficiency under simulated field conditions. IonoGlide lubricants are envisioned for use primarily in metallic ball-bearing conditions at low pressures.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Innosense, LLC	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Torrance, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
California	Texas

Project Transitions

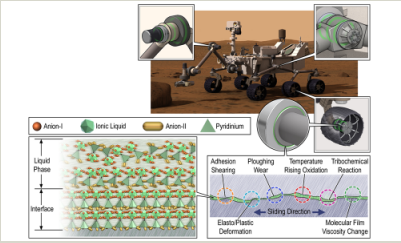
April 2012: Project Start

October 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137402)*

Images



Project Image
Modified Ionic Liquid-Based High-Performance Lubricants for Robotic Operations
(https://techport.nasa.gov/image/131243)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Innosense, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

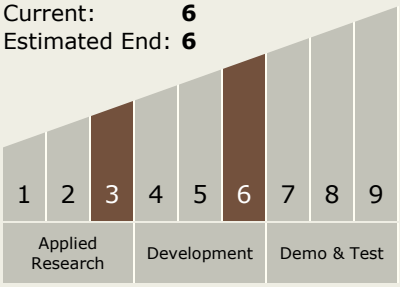
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
David C Hess

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.4 Surface Mobility

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System